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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,083	03/03/2004	Hironori Kakiuchi	890050.467	4894

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SEED INTELLECTUAL PROPERTY LAW GROUP PLLC
701 FIFTH AVE
SUITE 5400
SEATTLE, WA 98104

EXAMINER	
MUHAMMED, ABDUKADER S	
ART UNIT	**PAPER NUMBER**
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/792,083	KAKIUCHI ET AL.
	Examiner	Art Unit
	Abdukader Muhammed	2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawing

2. Figures 3-10 should be designated by a legend such as --**Prior Art**-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 1 is objected to because of the following informalities:

In claim 1, lines 10-11 cite the limitation "where D21 is smaller than **D2**, D22 is larger than **D2**"but there is no indication what D2 is representing. The examiner interprets D2 as representing the thickness of the dielectric film; in accord with page 6, lines 20-23 "if the thickness of at least one of the first dielectric film and the second dielectric film is determined so as to be equal to the thickness D2".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kojima et al. (US Publication 2002/0024913 A1).

Regarding Claim 1, Kojima et al. teach an optical recording medium comprising a support substrate (substrate 12; see figures 1 and 3) and a plurality of information recording layers (information recording layers 18 and 27; see figures 1 and 3), at least one information recording layer other than an information recording layer farthest from a light incidence plane through which a laser beam is projected comprising a first dielectric film, a second dielectric film and a recording layer disposed between the first dielectric film and the second dielectric film (a recording layer 18 is disposed between dielectric layers 16 and 20; see figures 1 and 3 and page 4, paragraph [0050], lines 3-6) and a thickness of at least one of the first dielectric film and the second dielectric film D2 is given as D21<D2<D22, and D21 and D22 are determined in such a manner that the dependency X of light transmittance of the information recording layer other than the information recording layer farthest from the light incidence plane on the wavelength of a laser beam is smaller than 1.2X2 when at least one of the first dielectric film and the second dielectric film has a thickness of D21 to D22, where X2 is the wavelength dependency corresponding to a second smallest thickness among a plurality of thicknesses at which the dependency X of light transmittance of the at least one information recording layer other than the information recording layer farthest from the light incidence plane on the wavelength of a laser

beam locally becomes minimal. In the instant application the optimal rage (D21<D2<D22) satisfying the above description is given in page 32, lines 15-17 as "the second dielectric layer 32 is formed so as to have a thickness of 100 nm to 130 nm and the first dielectric layer 34 is formed so as to have a thickness of 20 nm to 30 nm". Kojima et al. teach the first dielectric layer 16 with thickness of 110 nm and the second dielectric layer with thickness 22 nm; see page 10, paragraph [0114], lines 3-7.

Regarding Claim 2, as applied to claim 1 above and Kojima et al. further teach that the laser beam has a wavelength of 380 nm to 450 nm (wavelength of laser is 390 nm to 430 nm; see page 3, paragraph [0034], lines 11-14).

Regarding Claim 3, as applied to claim 1 above and Kojima et al. further teach that at least one of the first dielectric film and the second dielectric film is formed of a mixture of ZnS and SiO_2 (dielectric layers are formed from a mixture of Zns-SiO_2; see page 5, paragraph [0058], lines 10-12).

Regarding Claim 4, as applied to claim 2 above and Kojima et al. further teach that at least one of the first dielectric film and the second dielectric film is formed of a mixture of ZnS and SiO_2 (dielectric layers are formed from a mixture of Zns-SiO_2; see page 5, paragraph [0058], lines 10-12).

Regarding Claim 5, as applied to claim 3 above and Kojima et al. further teach that the light incidence plane is disposed on the side opposite to the support substrate with respect to the plurality of information recording layers (the light incidence plane is disposed on the side opposite to the support substrate 12; see figures 1 and 3), the first dielectric film is disposed on

the side of the light incidence plane with respect to the recording layer and is formed of TiO_2 (the first dielectric flayer 16 is disposed form the light incidence side, see figures 1 and 3, and is made from ZnO, TiO_2;see page 5, paragraph [0058], lines 3-7 for more lists) and the second dielectric film is disposed on the side of the support substrate and is formed of a mixture of ZnS and SiO_2 (the second dielectric layer 20 is disposed on the side of the substrate 12, see figures 1 and 3, and it is formed from a mixture of Zns-SiO_2; see page 5, paragraph [0058], lines 10-12).

Regarding Claim 6, as applied to claim 4 above and Kojima et al. further teach that the light incidence plane is disposed on the side opposite to the support substrate with respect to the plurality of information recording layers (the light incidence plane is disposed on the side opposite to the support substrate 12; see figures 1 and 3), the first dielectric film is disposed on the side of the light incidence plane with respect to the recording layer and is formed of TiO_2 (the first dielectric flayer 16 is disposed form the light incidence side, see figures 1 and 3, and is made from ZnO, TiO2;see page 5, paragraph [0058], lines 3-7 for more lists) and the second dielectric film is disposed on the side of the support substrate and is formed of a mixture of ZnS and SiO_2 (the second dielectric layer 20 is disposed on the side of the substrate 12, see figures 1 and 3, and it is formed from a mixture of Zns-SiO_2; see page 5, paragraph [0058], lines 10-12).

Regarding Claim 7, as applied to claim 1 above and Kojima et al. further teach that the recording layer is constituted by a first recording film containing one element selected from the group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (the first recording layer 18 is made from materials Ge, Sn, Ag, Al, Cr, Si, Bi; see page 6, paragraph [0069] for more details) and a second recording film containing one element selected from the group consisting of Cu, Al, Zn, Ti and Ag (the second recording layer 27 is made from material such as Ge-Sb-Te,

Ge-Bi-Te, Ge-Sn-Te, Ag-In-Sb-Te and adding at least one element selected from the group consisting of Au, Ag, Cu, Al, Ga, Ti; see page 7, paragraph [0074] for more details) and different from the element contained in the first recording film as a primary component (the first and the second recording layer are different but can be made similar; see page 7, paragraph [0074], lines 1-3).

Regarding Claim 8, as applied to claim 2 above and Kojima et al. further teach that the recording layer is constituted by a first recording film containing one element selected from the group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (the first recording layer 18 is made from materials Ge, Sn, Ag, Al, Cr, Si, Bi; see page 6, paragraph [0069] for more details) and a second recording film containing one element selected from the group consisting of Cu, Al, Zn, Ti and Ag (the second recording layer 27 is made from material such as Ge-Sb-Te, Ge-Bi-Te, Ge-Sn-Te, Ag-In-Sb-Te and adding at least one element selected from the group consisting of Au, Ag, Cu, Al, Ga, Ti; see page 7, paragraph [0074] for more details) and different from the element contained in the first recording film as a primary component (the first and the second recording layer are different but can be made similar; see page 7, paragraph [0074], lines 1-3).

Regarding Claim 9, as applied to claim 3 above and Kojima et al. further teach that the recording layer is constituted by a first recording film containing one element selected from the group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (the first recording layer 18 is made from materials Ge, Sn, Ag, Al, Cr, Si, Bi; see page 6, paragraph [0069] for more details) and a second recording film containing one element selected from the group consisting of Cu, Al, Zn, Ti and Ag (the second recording layer 27 is made from material such as Ge-Sb-Te,

Ge-Bi-Te, Ge-Sn-Te, Ag-In-Sb-Te and adding at least one element selected from the group consisting of Au, Ag, Cu, Al, Ga, Ti; see page 7, paragraph [0074] for more details) and different from the element contained in the first recording film as a primary component (the first and the second recording layer are different but can be made similar; see page 7, paragraph [0074], lines 1-3).

Regarding Claim 10, as applied to claim 4 above and Kojima et al. further teach that the recording layer is constituted by a first recording film containing one element selected from the group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (the first recording layer 18 is made from materials Ge, Sn, Ag, Al, Cr, Si, Bi; see page 6, paragraph [0069] for more details) and a second recording film containing one element selected from the group consisting of Cu, Al, Zn, Ti and Ag (the second recording layer 27 is made from material such as Ge-Sb-Te, Ge-Bi-Te, Ge-Sn-Te, Ag-In-Sb-Te and adding at least one element selected from the group consisting of Au, Ag, Cu, Al, Ga, Ti; see page 7, paragraph [0074] for more details) and different from the element contained in the first recording film as a primary component (the first and the second recording layer are different but can be made similar; see page 7, paragraph [0074], lines 1-3).

Regarding Claim 11, as applied to claim 5 above and Kojima et al. further teach that the recording layer is constituted by a first recording film containing one element selected from the group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (the first recording layer 18 is made from materials Ge, Sn, Ag, Al, Cr, Si, Bi; see page 6, paragraph [0069] for more details) and a second recording film containing one element selected from the group consisting of Cu, Al, Zn, Ti and Ag (the second recording layer 27 is made from material such as Ge-Sb-Te,

Ge-Bi-Te, Ge-Sn-Te, Ag-In-Sb-Te and adding at least one element selected from the group consisting of Au, Ag, Cu, Al, Ga, Ti; see page 7, paragraph [0074] for more details) and different from the element contained in the first recording film as a primary component (the first and the second recording layer are different but can be made similar; see page 7, paragraph [0074], lines 1-3).

Regarding Claim 12, as applied to claim 6 above and Kojima et al. further teach that the recording layer is constituted by a first recording film containing one element selected from the group consisting of Si, Ge, Sn, Mg, In, Zn, Bi and Al as a primary component (the first recording layer 18 is made from materials Ge, Sn, Ag, Al, Cr, Si, Bi; see page 6, paragraph [0069] for more details) and a second recording film containing one element selected from the group consisting of Cu, Al, Zn, Ti and Ag (the second recording layer 27 is made from material such as Ge-Sb-Te, Ge-Bi-Te, Ge-Sn-Te, Ag-In-Sb-Te and adding at least one element selected from the group consisting of Au, Ag, Cu, Al, Ga, Ti; see page 7, paragraph [0074] for more details) and different from the element contained in the first recording film as a primary component (the first and the second recording layer are different but can be similar; see page 7, paragraph [0074], lines 1-3).

Regarding Claim 13, as applied to claim 7 above and Kojima et al. further teach that the first recording film contains Si as a primary component (the first recording layer 18 contains one element selected from Ag, Al, Si; see page 6, paragraph [0069], lines 5-7) and the second recording film contains Cu as a primary component (the second recording layer 27 contains one element selected from Au, Ag, Cu, Al, Ga; see page 7, paragraph [0074], lines 7-10).

Regarding Claim 14, as applied to claim 8 above and Kojima et al. further teach that the first recording film contains Si as a primary component (the first recording layer 18 contains one

element selected from Ag, Al, Si; see page 6, paragraph [0069], lines 5-7) and the second recording film contains Cu as a primary component (the second recording layer 27 contains one element selected from Au, Ag, Cu, Al, Ga; see page 7, paragraph [0074], lines 7-10).

Regarding Claim 15, as applied to claim 9 above and Kojima et al. further teach that the first recording film contains Si as a primary component (the first recording layer 18 contains one element selected from Ag, Al, Si; see page 6, paragraph [0069], lines 5-7) and the second recording film contains Cu as a primary component (the second recording layer 27 contains one element selected from Au, Ag, Cu, Al, Ga; see page 7, paragraph [0074], lines 7-10).

Regarding Claim 16, as applied to claim 10 above and Kojima et al. further teach that the first recording film contains Si as a primary component (the first recording layer 18 contains one element selected from Ag, Al, Si; see page 6, paragraph [0069], lines 5-7) and the second recording film contains Cu as a primary component (the second recording layer 27 contains one element selected from Au, Ag, Cu, Al, Ga; see page 7, paragraph [0074], lines 7-10).

Regarding Claim 17, as applied to claim 11 above and Kojima et al. further teach that the first recording film contains Si as a primary component (the first recording layer 18 contains one element selected from Ag, Al, Si; see page 6, paragraph [0069], lines 5-7) and the second recording film contains Cu as a primary component (the second recording layer 27 contains one element selected from Au, Ag, Cu, Al, Ga; see page 7, paragraph [0074], lines 7-10).

Regarding Claim 18, as applied to claim 12 above and Kojima et al. further teach that the first recording film contains Si as a primary component (the first recording layer 18 contains one element selected from Ag, Al, Si; see page 6, paragraph [0069], lines 5-7) and the second

recording film contains Cu as a primary component (the second recording layer 27 contains one element selected from Au, Ag, Cu, Al, Ga; see page 7, paragraph [0074], lines 7-10).

Regarding Claim 19, Kojima et al. teach an optical recording medium comprising a support substrate (substrate 12; see figures 1 and 3) and a plurality of information recording layers (information recording layers 18 and 27; see figures 1 and 3), at least one information recording layer other than an information recording layer farthest from a light incidence plane through which a laser beam is projected comprising a first dielectric film, a second dielectric film and a recording layer disposed between the first dielectric film and the second dielectric film (a recording layer 18 on the light incidence side is disposed between dielectric layers 16 and 20; see figures 1 and 3 and page 4, paragraph [0050], lines 3-6), and at least one of the first dielectric film and the second dielectric film being formed of a mixture of ZnS and SiO_2 (dielectric layers are formed from a mixture of Zns-SiO_2; see page 5, paragraph [0058], lines 10-12) so as to have a thickness of 100 nm to 130 nm (at least the first dielectric layer 16 with a thickness of 110 nm; see page 10, paragraph [0114], lines 3-5).

Conclusion

6. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Saito et al. (US 6245404) teach an optical medium with a double recording layer made from a mixture of Ge, Sb, Ag, Al, Ti, and other elements, the dielectric film made from ZnS-SiO_2 (see figure 3).

Suzuki et al. (US 2001/0012257 A1) teach an optical medium with a dual recording layer made from a mixture of GeSbTe in combination with other elements, the dielectric film made from ZnS-SiO_2 (see figure 1).

Hanaoka et al. (US 2002/0160306 A1) teach an optical medium with a double recording layer made from a mixture of GeSbTe compounds and other elements, the dielectric film made from ZnS-SiO_2 (see figures 2 and 3).

Meinders et al. (US 6528138 B2) teach an optical information medium for rewritable recording by means of a laser-light beam, which comprises a substrate having disposed on a side thereof: a first recording stack including a phase change type recording layer, sandwiched between two dielectric layers. The dielectric film made from ZnS-SiO_2 (see figure 1).

Miyagawa et al. (US 20030081523 A1) teach an optical medium with a dual recording layer made from a phase-change material incorporating Te, In or Se as a primary component. Primary components of phase-change materials include Te--Sb-Ge, Te-Ge, Te-Ge-Sn, Te-Ge-Sn-Au, Sb-Se, Sb-Te, Sb-Se-Te, In-Te, In-Se, In-Se-Te, In-Sb, In-Sb-Se, and In-Se-Te. The dielectric film made from ZnS-SiO_2 (see figure 2).

Yasuda et al. (US 20030134229 A1) teach a multi-layered optical disc having its recording unit comprised of plural information recording layers. The recording layers are made form a phase change compounds of GeSbTe and the dielectric film is made from ZnS-SiO2 (see figures 5 and 22)

Miura et al. (US 7167431 B2) teach an optical medium with a dual recording layer made from an SbTe compound alone, or InSbTeGe, AgInSbTe, Ag SbTeGe, AgInSbTeGe or the like

containing In, Te, Ge, Ag or the like as additives. The dielectric film made from $ZnS\text{-}SiO_2$ (see figure 1 and 5).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abdukader Muhammed whose telephone number is (571) 270-1226. The examiner can normally be reached on Monday-Thursday 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. Customer Service can be reached at (571) 272-2600. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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28 March 2007

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER